



Completed view of the project in March 2022



Walls and Slopes
Nº 479

Drainage Upgrade at Sg Tampines

📍 Sungai Tampines, Singapore

CONSTRUCTED IN 2022

Benefits

Fertile backfill soil
promotes vegetation
growth as a natural erosion
control measure

Ease of construction
without the need for heavy
machinery to lift the geogrid

City greening
sustainable construction

A living engineered slope

Tensor RE500 uniaxial (primary) and biaxial (secondary) geogrids were used to replace a reinforced concrete structure for the construction of a 3.8m high reinforced soil slope, or commonly known by the locals as vegetated reinforced soil slope (VRSS) along Sungei Tampines.

CLIENT'S CHALLENGE

The conventional approach for building wider and deeper drains to quickly collect and channel rainwater runoff away from urban catchments was deemed to be no longer adequate or sustainable to cope with the challenge of climate change, limited land and increasing urbanisation in Singapore. The National Water Agency's upgrading work at Sungei Tampines called for green and sustainable solutions for the drainage system.

TENSAR SOLUTION

Instead of using a traditional concrete channel, uniaxial and biaxial reinforcement geogrid were proposed to form the a green slope that not only enhanced the slope stability, also help to nurture the vegetation growth. The vegetation played an important role in treating storm water runoff prior to discharging into downstream drainage. Biaxial and geotextile were used to form green slope facing to prevent soil erosion prior to plant maturity.



Plant's rootball inserted into the backfill material, surrounded by reinforced geogrid, to promote optimal growth and facing stability.

PROJECT BACKGROUND

Active – Beautiful – Clean (ABC) Program was championed by Public Utility Board (PUB) for drainage and reservoir system upgrading work in Singapore. Apart from structure's durability, PUB was also looking for a green and sustainable alternative to traditional reinforced concrete structure such as a bioengineering slope.

VRSS proposed the use of uniaxial geogrid as primary reinforcement, and biaxial geogrid and geotextile as facing, which was designed with 1m to 1.4m setback at every 0.4m spacing up to 3.8m high. The facing geogrid could be cut to insert the plant's rootball at the designed interval without affecting the primary reinforcement geogrid. The flexibility in backfill material was the key success in supporting healthy vegetation growth and upon completion, the slope was covered with lush green facing. Apart from greening the river bank, VRSS also serves as a natural filtration system for stormwater prior to discharging into the downstream drainage system.

Polymeric geogrid is inert for most soil conditions which makes it suitable for waterfront projects without degradation in performance. Sungei Tampines is the first project to adopt VRSS and it illustrated a good balance between urbanisation and sustainability in retaining structure.

Main contractor

Eng Lam Contractor

Consultant

One Smart Engineering
Pte. Ltd.

Client

Public Utilities Board

“ Tensor RE Series geogrid provides an excellent solution for constructing Bio-Engineering Vegetated Reinforced Soil Slopes (VRSS). Not only because it offers easy handling during layer-by-layer construction, the wraparound facing also facilitated vegetation planting to withstands storm water flow. Its durability ensures long-lasting performance, making it an ideal choice for VRSS construction.”

Kance

Project Manager
Eng Lam Contractor